Patent claims

1. Process for determining the PMD-induced outage probability of an optical transmission system which includes an optical transmission line (10, 11, 12, 13a, 13b, 14, 15, 20) comprising at least one optical input and one optical output during a specified/specifiable observation period (T_{total}) and within which at least in one position of the transmission line (10, 11, 12, 13a, 13b, 14, 15, 20) the polarization states of the optical transmission system and/or the optical signals transmitted by the optical transmission system are changed by bringing a targeted intervention to bear and at a second position, which is interposed at least one place downstream from the first position of the optical transmission line (10, 11, 12, 13a, 13b, 14, 15, 20), a specified/specifiable signal characteristic (BER) is qualitatively measured and checked for compliance with a specified/specifiable threshold condition (BER_{th}) and the PMD-induced outage probability of the optical transmission system is calculated on the basis of the ratio between the length of time (T_{out}) during which the measured signal characteristic fails to meet the threshold condition (BER_{th}) and the length of the observation period (T_{total}).

2. Process in accordance with Claim 1, further characterized by the fact that the process is applied to an optical transmission line (10, 11, 12, 13a, 13b, 14, 15, 20) which comprises a first optical element (10) and a second optical element (20) and a multitude of additional optical elements (11, 12, 13a, 13b, 14, 15) imposed between the first optical element and the second optical element wherein the changes of the polarization states of the optical transmission system

and/or the signals transmitted by the optical transmission system are carried out at the position of the first element (10) and/or the additional optical elements (11, 12, 13a, 13b, 14, 15) and the measurement of the signal characteristics (BER) is carried out at or close to the second optical element (20).

3. Process in accordance with the above Claim, further characterized by the fact that the signal characteristics (BER) are either directly measured or indirectly determined at the second optical element (20).

4. Process in accordance with the above Claim, further characterized by the fact that a part of the transmitted optical signals for the indirect determination are diverted upstream of the second optical element (20).

5. Process in accordance with one of the above Claims, further characterized by the fact that the change in the polarization states of the optical transmission and/or the optical signals transmitted by the optical transmission system are implemented by launching and/or transmission of optical signals with varied polarization states which are to be transmitted.

6. Process in accordance with one of the above Claims, further characterized by the fact that during the observation period (T_{total}) a multitude of polarization states are tested through simultaneously or successively during the observation period, particularly if these are tested in an automated manner, and for the respective settings or combinations of settings the signal characteristics (BER) are

correspondingly measured and checked against the threshold condition (BER_{th}) and the PMD-induced outage probability of the optical transmission system may be calculated on the basis of the ratio of the sum of all shares of the time (T_{out-n}), during which the signal characteristics measured fail to meet threshold condition (BER_{th}), to the observation period (T_{total}).

7. Process in accordance with one of the above Claims, further characterized by the fact that a digital or analog signal is used for carrying out the process.

8. Process in accordance with one of the above Claims, further characterized by the fact that the signal characteristic is measured as the bit error rate (BER), an eye diagram or the amplitude of the signal.

9. Process in accordance with one of the above Claims, further characterized by the fact that a maximum and/or a minimum signal characteristic value is specified as a threshold value.

10. Process in accordance with one of the above Claims, further characterized by the fact that the optical transmission system for carrying out the process is modified in its entirety in such a manner that the outage probability is determined for the modified transmission system and the outage probability of the optical transmission system is determined without modification by inference.

11. Process in accordance with one of the above Claims, further characterized by the fact that for carrying out the process an attenuator is introduced to reduce the observation period.

12. Process in accordance with one of the above Claims, further characterized by the fact that at least one polarization controller (P-CON 13a) and/or at least one polarization scrambler (P-SCR1, P-SCR2, 11, 13b) are used to vary the polarization states.

13. Process in accordance with one of the above Claims, further characterized by the fact that the process is applied to a real optical transmission line.

14. Process in accordance with one of the above Claims 1 to 12, further characterized by the fact that the process is applied in form of a computer simulation to a model of an optical transmission line.

15. Use of an optical transmission system to carry out the process in accordance with one of the above claims.

16. Apparatus to carry out a process for the determination of a PMD-induced outage probability of an optical transmission system which has an optical transmission line (10, 11, 12, 13a, 13b, 14, 15, 20) comprising at least one optical input and one optical output whereby the apparatus possesses a device for applying a targeted intervention during a specified/specifiable observation period (T_{total}) in at least one position of the optical transmission line (10, 11, 12, 13a, 13b, 14, 15, 20) in such a manner that the polarization states of the optical transmission system and/or the signals transmitted by the optical polarization system are modifiable,

a device for the qualitative measurement of a specified/specifiable observation period (T_{total}) of a specified/specifiable signal characteristic (BER) at a

second position which is interposed at least one place downstream from the first position of the optical transmission line (10, 11, 12, 13a, 13b, 14, 15, 20),

a device for checking the measured signal characteristic (BER) in relation to a specified/specifiable threshold value (BER_{th}), and

a device for calculating the ratio of the share of time (T_{out}), during which the measured signal characteristic has failed to meet the threshold condition (BER_{th}), to the observation period (T_{total})